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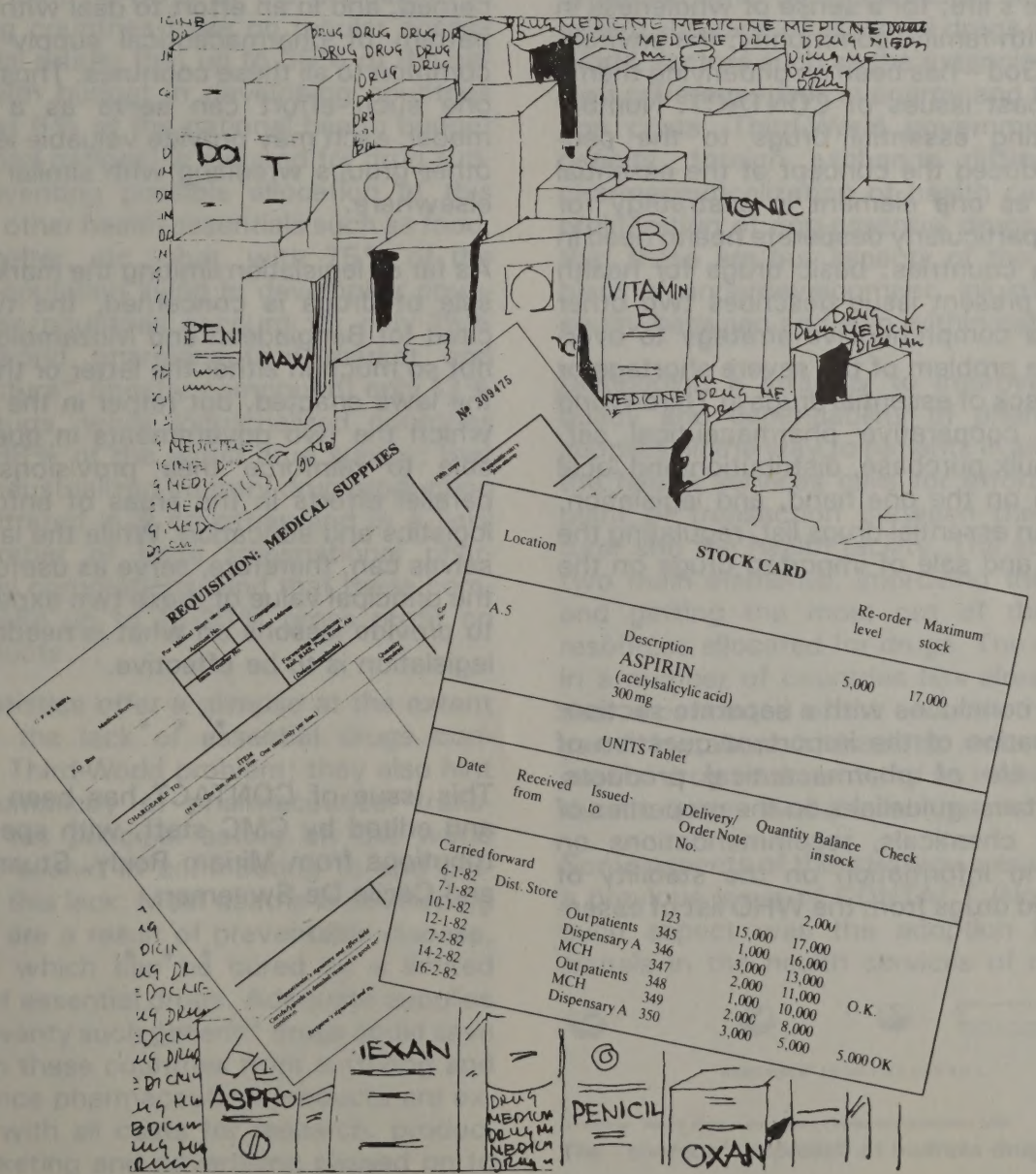
STRENGTHENING AND REGULATING THE SUPPLY, DISTRIBUTION AND PRODUCTION OF BASIC PHARMACEUTICAL PRODUCTS



Also in this issue:
Shelf Life of Drug Supplies

Note to CONTACT subscribers

While in principal, six issues of CONTACT appear each year, the pressure on CMC staff time, in view of preparations for the forthcoming Assembly of the WCC in July/August in Vancouver, are such that a decision has been taken to bring out only five issues this year. Thus, there is no April 1983 issue of CONTACT.

EDITORIAL NOTE

How to meet health needs – for food, water, shelter; for health care, land, work and education; for the right to participate in decisions affecting one's life; for a sense of wholeness in oneself, with family, community, the environment and God – has been an underlying theme of many past issues of CONTACT. Number 63, "Getting essential drugs to the people", introduced the concept of the essential drugs list as one element in a strategy for meeting a particularly desperate health need in developing countries: basic drugs for health care. The present issue describes two other facets of a comprehensive strategy to overcoming the problem of the severe shortage or complete lack of essential drugs in Third-World countries: cooperative pharmaceutical services for bulk purchase, distribution and local production on the one hand, and legislation, based on an essential drugs list, regulating the marketing and sale of imported drugs on the other.

This issue concludes with a separate section: an examination of the important question of the shelf life of pharmaceutical products, which contains guidelines on the properties of dangerous chemicals, recommendations on storage and information on the stability of 33 selected drugs from the WHO list of essential drugs.

The cooperative pharmaceutical services described in this issue were initiated by church and non-governmental organizations (NGOs) both as a response to special circumstances in the particular countries concerned, and in an effort to deal with a general pattern of pharmaceutical supply problems common to all these countries. Thus, while no one such effort can serve as a universal model, each may provide valuable lessons for other groups wrestling with similar problems elsewhere.

As far as legislation limiting the marketing and sale of drugs is concerned, the two cases cited (of Bangladesh and Mozambique) differ not so much in either the letter or the spirit of the laws enacted, but rather in the extent to which the two governments in question are able to reinforce their provisions through parallel efforts in the areas of enforcement, logistics and education. While the laws themselves can, therefore, serve as useful models, the principal value of these two experiences is to provide lessons on what is needed if such legislation is to be effective.

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This issue of CONTACT has been compiled and edited by CMC staff, with specific contributions from Miriam Reidy, Stuart Kingma and Cécile De Sweemer.

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STRENGTHENING AND REGULATING THE SUPPLY, DISTRIBUTION AND PRODUCTION OF BASIC PHARMACEUTICAL PRODUCTS

INTRODUCTION

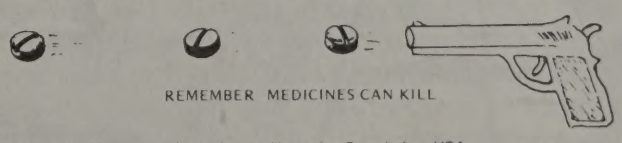
When attempting to gain a true picture of the pharmaceutical situation in the Third World, we come across some alarming statistics. We may read that 60-80% of the population in developing countries have no regular access to essential drugs; that up to 35% of the national health budget in developing countries (as against 6% of the national health budget in developed nations) is required for drug supplies, preventing possible allocation of this money to other health essentials such as food, water, shelter, etc.; that, with 75% of the world's population living in developing countries, these countries account for only 15% of the world pharmaceutical market and "manufacture" (mostly compound) only 12% of the drugs, while industrialized countries produce 88% of the world drug supply; that 90% of industrialized-country drug production is concentrated in 9 countries and in a very small number of large transnational pharmaceutical corporations; and that these companies make up to 15-20% gross profit on their products...

These statistics offer a glimpse at the extent to which the lack of essential drugs constitutes a Third-World problem; they also hint at the complicity of pharmaceutical transnationals (as principal actors on the world economic scene) in contributing to and perpetuating this lack. Most deaths in developing countries are a result of preventable disease, or illness which can be cured by a limited number of essential drugs. Adequate supplies of even twenty such generic* drugs could save millions in these countries from suffering and death. Since pharmaceutical products are expensive, with all costs for research, production, marketing and advertising passed on to the patient, the majority of the poor in the Third World cannot afford them. "The price of 20 tablets of the top-selling antibacterial drug in Mexico would provide a family of 4 with their basic food for 2 weeks."(1)

Whatever other factors are cited to explain the severe shortage of essential drugs in the Third World, factors such as the extension of health care coverage, rises in energy and transportation costs, Third-World governments' trade deficits, foreign exchange difficulties, the pharmaceuticalization of health care and the proliferation of non-essential drugs, it is clear that these are but aspects of the basic problem of underdevelopment, injustice and inequity between and also within nations.

Developing a strategy to improve the adequacy and dependability of pharmaceutical supplies all the way to patients in all sectors of the health services calls for efforts at every point of transaction between the manufacturer and the health facility. The strategy has two main elements: improving the logistics, and getting the most out of the financial resources allocated for drugs. The experience in a number of countries has already shown that a concerted effort on both these fronts can bring about a dramatic reduction in the cost of drug treatment and an improvement in the medicines available on the shelves.

Some aspects of this strategy were covered in a previous issue of CONTACT (No. 63). One such aspect was the adoption by professionals in the health services of responsible



D. Werner: *Where there is no doctor, Hesperian Foundation, USA*

The "shotgun" approach of multiple drug therapy

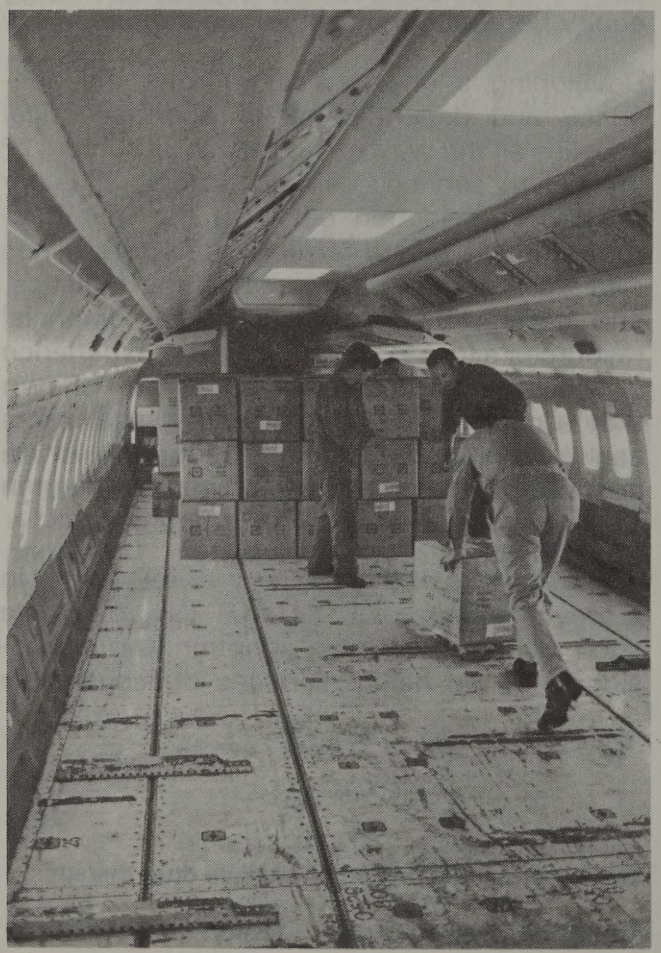
prescribing practices which avoid the "shotgun" approach of multiple drug therapy and limit themselves to essential drugs,

*Identifying a drug by its generic name means using its basic chemical name and not a trademarked proprietary name.

ordered and prescribed in their generic form in conformity with a strictly limited formulary appropriate to the level of the service being offered. Another aspect is the effort to be made by the administrative or managerial staff to keep a careful inventory of drug stocks, use proper storage practices, estimate annual requirements of each item in the formulary, and purchase supplies through annual tender.

The problems are somewhat different for governments, government health services and non-governmental organizations. The experiences described in this report are those of NGO- and, primarily, church-related health services in developing countries. Their efforts have been strongly supported by both public- and private-sector agencies in the industrialized countries which are able to provide special services on the procurement and shipping end of the supply line. In the public sector, UNICEF operates essential drugs purchasing, stocking and shipping services at very advantageous prices. In the private sector, church-related and voluntary agency groups have been formed to provide a similar service, aimed particularly at church- and NGO-related health programmes in developing countries. Orders received on an annual tender basis have allowed these agencies to secure large supplies at the most reduced prices. They maintain stocks according to a limited list of generic drugs and have developed improved methods of packing and shipping. Since most are not-for-profit organizations, they are able to effect major economies in the supply of drugs to health programmes. It is between the two ends of the system that the greatest logistical difficulties still remain, particularly in the receiving and distribution process. In an effort to overcome these difficulties, a number of church-related health services' coordinating associations have established their own co-operative pharmaceutical services. The main functions of the latter services are:

- to gather orders from a large number of member health programmes;
- to put out bulk tenders and orders, utilizing the services of procurement agencies in the industrialized countries;
- to set up mechanismes to handle financial transactions and the exchange between hard international currencies and the local currency;
- to establish procedures for customs clearance;
- to set up receiving and storage facilities; and
- to look after the redistribution of purchased supplies to individual health facilities.



WHO photo by D. Henrioud

Bulk transport of pharmaceuticals

In addition to orchestrating all these steps, certain cooperative pharmaceutical services are beginning to compound pharmaceutical products, and several have even established sophisticated production units and quality control laboratories. It is the experience of these services that we wish to examine in this issue of CONTACT.

COOPERATIVE PHARMACEUTICAL SERVICES

Lesotho

The church has, for a long time, been a strong pillar in providing health services in Lesotho. A total of 19 hospitals, 83 clinics and some 60 outstations, with a total of 2272 hospital beds, and offering mainly curative services, are run by the churches. The concept of primary health care (PHC) is fully accepted by the government, and an action committee to establish preventive services has been set up

within the Ministry of Health. Non-governmental organizations are also moving into primary health care and now participate in this action committee.

In 1974, the various churches involved in providing health services in Lesotho got together with a few other NGOs to look at the possibilities of establishing a coordinating association. The CMC offered some assistance in facilitating this effort and, in 1975, the Private Health Association of Lesotho (PHAL) was established. In 1977, PHAL engaged a pharmaceutical consultant to look at the possibility of establishing a compounding and production unit for generic pharmaceutical products on a non-profit basis. The Government of Lesotho was also interested in working in this direction, and it was decided to initiate a joint PHAL/Government project. This project was supported by external donor funding, and a supportive relationship to Dutch pharmaceutical procurement and consulting agencies was established. The organization was called the Lesotho Dispensary Association (LDA). Its board consists of equal representation by Government and PHAL officers. Its aim is to produce quality essential generic pharmaceuticals on a non-profit basis to meet the needs of the people of Lesotho. As part of the LDA project, a quality control laboratory was established. This is projected to grow as production levels increase and as the possibility for providing supplies and quality control to neighbouring countries also develops. In 1980, the government decided to bring its own central drugstores under the same management, and the National Drug Stockpile Organisation (NDSO) was created. This side of the organization imports the required drugs which are not produced by LDA and stocks pharmaceutical supplies for all the health services in the country.

The LDA now compounds and produces some 100 different items including tablets, capsules, ointments, syrups and other liquids. Its packing department deals with large quantities of small packs, and labels in any required language are also produced in-house. Products are manufactured according to national and, as far as possible, international pharmaceutical quality standards. The quality control laboratory checks all the essential steps in the production process and also does random checks of imported finished products, while regular external checking of LDA product quality is effected by independent quality control laboratories through service contracts. The LDA employs around 100 people, most of whom are local people. It offers practical training for University of Lesotho students in its laboratory and shares its experiences with other national agencies intending to implement drug supply/distribution/production programmes. It also serves as a nucleus for the development of a national quality control laboratory.

The LDA production facility is presently able to fulfil all of the needs of public and voluntary agency health services in the country for the 100 items which it compounds and produces. It is also able to maintain a surplus production level to allow for exporting supplies of these products to neighbouring countries. LDA has contractual arrangements to ship certain supplies to Mozambique, Swaziland, Botswana, Malawi, Zambia, Zaïre and Madagascar, with negotiations under way to begin supplying other countries in the southern African region. Present levels of export to these countries are relatively low, but can be expected to grow with time. To meet a growing demand, LDA will have to face a number of problems, among which are the shortage of skilled personnel, the necessity for lengthy training to meet the technical needs of the Association, as well as difficulties in the areas of water supply, waste treatment and disposal, electricity and the like. These technical problems are being dealt with, but continue to impose certain growth limitations. In addition, there are limitations on capital reserves, which oblige LDA to restrict credit facilities in its export markets, and the Association sometimes loses out as a result.

The NDSO is responsible for rational procurement, proper storage and equitable distribution of medicines and medical supplies, free of charge, to all Lesotho health facilities, both private and government. It has a storage facility of 1300 square metres, with a cold room. Responsible for annual national pharmaceutical planning and hospital budget control for pharmaceutical supplies, the NDSO exercises central control over, and monitors drug donations to, Lesotho as well as drug consumption and needs. It also trains personnel to work in the dispensaries and assists them to improve their services; publishes a drug information bulletin; coordinates the activities of the National Drug Formulary Committee; streamlines its own supplies and eliminates non-planned inventory holding, thus guaranteeing regular availability of products; and provides

an assured market and market information to the LDA.

LDA and the NDSO together bridge the gap between government and private health institutions, thus ensuring equitable sharing of drugs and supplies. Their work has proved that it is possible to start up an industry as sophisticated as the manufacture of essential drugs in a developing country, and that this can bring considerable savings (of 15-20% in Lesotho's drug budget). Keeping the two organizations under one management has also brought savings in management costs and better utilization of the few qualified people available. By creating a standard drug list, LDA/NDSO have assured an adequate range of fresh essential drugs and minimized duplication and overlap of expensive preparations. The establishment of a planned system of distribution with guaranteed availability has greatly reduced the inventory holding in hospitals, thus releasing money to improve services and facilities as well as building up a revolving fund for timely stock replenishment. The services of the quality control laboratory remain crucial to this organization and offer a model for a regional quality control laboratory which may need to provide such services until national laboratories can be established.

Nigeria

Nigeria, the most populous country in Africa, has been served for many decades by churches and other voluntary organizations in the health sector. In 1972, the churches began to discuss the possibility of forming a coordinating association for health planning and cooperation. A 1973 consultation looked at the churches' contributions and made a commitment to form such an association. Churches in the northern part of Nigeria had been cooperating for several years already through a Christian Central Pharmacy (CCP) in Jos. This was established as an importing and distributing agency for missions and churches, and it began compounding operations in 1970. With the foundation of the national coordinating association, the Christian Health Association of Nigeria (CHAN) in December 1973, the possibility of expanding the CCP service to the rest of the country began to be explored. With support and planning advice from the CMC and the financial assistance of a church-related European donor agency, a national cooperative pharmaceutical service – CHANPHARM – was established in 1978.

During 1979, CHANPHARM carried out detailed surveys of all its member health programmes and hospitals, building towards the consolidation of a single annual drug order which would realistically reflect its members' requirements. At first, that order was confined to the 20 most essential drugs required for community health programmes and hospitals. With the completion of a third order in 1982, CHANPHARM had expanded its drug list to 38 different items, destined for 52 of CHAN's 90 member hospitals and a number of rural clinic programmes. During this growth period, the operation moved from having to await the arrival of a sufficient volume of low-demand orders before putting these out for bids, to a situation where high-volume new orders require careful screening to allow the most effective use of the available funds.

Having experienced a 3-year period of rapid growth, CHANPHARM is now faced with certain constraints which were, in fact, anticipated from its beginning. One significant restraint is the necessity to mobilize hard-currency foreign exchange to support their already massive orders. A second factor requiring careful management is internal distribution, a troublesome element in a country as vast as Nigeria and with the large volume, weight and bulk of orders. Drugs are distributed out of three regional distribution points, related to the health programmes served and to national transportation networks. Compounding and production from finished raw materials have begun in a slow and programmed way. This has been organized around an expansion of the CCP's compounding facilities. The latter continues to be a collaborating partner and functional part of CHANPHARM.

Realizing that examining the experiences of CHANPHARM, LDA/NDSO and of other cooperative pharmaceutical services in Africa could be of tremendous value to groups struggling with the same problems in other countries, CMC called a Geneva consultation on cooperative pharmaceutical services for church-related health programmes in Africa in December 1981. Key people from a number of these programmes as well as representatives from a variety of UN and non-governmental organizations also deeply engaged in the pharmaceutical supply question were invited to attend the consultation. CHANPHARM's experience was presented by CHAN's general secretary – one of the principal organizers of its administration

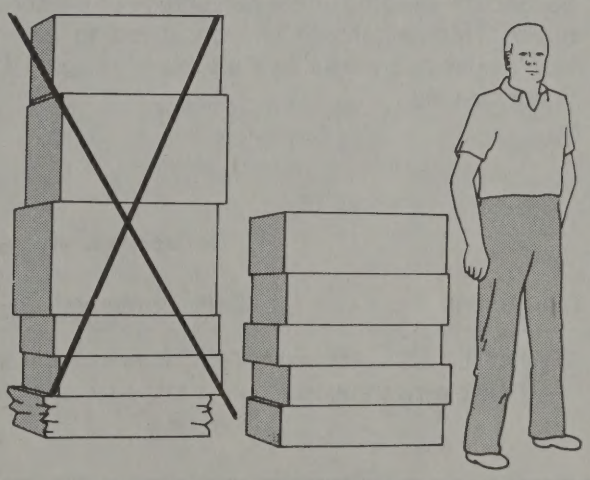
and source of much of the energy required to get such a complicated operation into motion. Information and insights on a wide range of elements in setting up and managing a cooperative pharmaceutical service were shared; this information appeared in the consultation report[2] and is summarized in the box below.

Working relationships

Trust relationships with supply agency personnel, clearing and forwarding agents, member hospitals, are essential and can be promoted by personal visitation, investigation, learning about their difficulties and by securing written agreements. The first essential step is to establish informal and, later, formalized agreements with the ministries of health and finance and the central bank. This needs to be mediated through personal contacts and visits to key people. The operation needs a careful balance between boldness and caution with calculation of risks, exploring all possible options and exercising discretion in providing information. The establishment of the relevant formulary requires detailed contact with the directors of all the health programmes participating in the pharmaceutical service, tempered by expert pharmaceutical advice on the principles of a generic-based essential drugs list.

Freight-handling

- Specialized equipment to move full seafreight containers is required. Fork-lifts are not adequate.
- A "Bill of Lading" is a proof of ownership, and security precautions must be taken to protect it.
- Invoices, receipts and transport waybills should be printed with the name of the legal entity "owning" the goods clearly in evidence.
- One 45-cubic metre volume sea freight container of medicine needs two 10-ton lorries to transport its unpacked contents. Special seafreight container lorries which can transport the whole container as near as possible to its destination are most useful when available. The same amount of money will be paid in freight (since an open lorry charges one way while a seafreight container charges both ways), but half the labour is necessary and the shipment is safer.
- Careful assessment of whether air- or seafreight should be used is needed. Airfreight costs over three times as much as seafreight, and logistical difficulties may mean it is seldom significantly faster. If airfreight must be used, sound surface alternatives should be developed and tested in case they are needed.
- Since sophisticated freight-handling methods and office equipment are liable to break down, it is advisable to use well-established labour-intensive methods and simple equipment.
- Storage space needs to be calculated and sorted in advance. A 60-sq, metre area (i.e., about 6 by 10 paces and 3 metres high) is the minimum space needed to sort the contents of a 45-cubic metre volume seafreight container. If stored in regular cardboard boxes, pharmaceuticals should only be stacked 2 metres high.
- Offloading sequence needs to be determined in advance and suppliers instructed accordingly, with indications as to how the boxes should be marked.



How to look after a health centre store, AHRTAG, UK

Well-planned storage space...

...and stacking

Pricing/cash flow/foreign exchange

The three elements of pricing – advance planning of orderly income, the disbursement of funds (cash flow), and method of paying for imported goods in the currency of the supply agency (foreign exchange) – are interdependent issues. Prices should be established to show local clients the magnitude of savings while assuring a large enough margin to adequately cover overhead costs.

There are three basic sources of foreign exchange:

1. Official government bank letters of credit (L/C) (to which a "transfers rate" of exchange applies);
2. Open currency exchanges in Europe; and
3. Gifts, grants, or loans made to local agencies from outside sources.

Since open currency exchanges in Europe operate on a "cash only" basis and devalue the foreign currency and since, in many countries, there are also restrictions on "exporting" the national currency, only the first and third options are possible.

In order to price goods, the rate of exchange must be projected. Because of fluctuations in these rates, the same rate of exchange should apply, whether the L/C or gift method is used. Another factor in pricing is the variable amount charged for freight. For instance, a customer may order a disproportionate amount of heavy goods, thus driving up costs. In order to compensate, a "freight adder" should be added to the price quoted by the supplier. A third factor which determines price is the margin of operating costs. In order to determine what this will be, an estimate of the value of the first turnover should be made, and the first year's budget projected. Then the budget is translated into a percentage of the turnover. This percentage is then added to each item's price to ensure that the costs of bringing it in are covered.

As regards cash flow planning, a monthly estimate of income should be made when the budget has been prepared and finalized. A month-by-month chart of income, expenditure and conditions should be prepared for a one-year period. This will help determine the project's weak points, if any.

Legal person and board

Many kinds of organization can carry a non-profit supply agency in the eyes of the law. Charitable organizations, especially if they create a separate division, banking facilities, etc., can be used. However, there is no limitation of the liability they carry. The limited liability company may be inappropriate in that it seeks to make and distribute a profit. In countries where provisions for them exist, foundations, not-for-profit corporations or companies limited by guarantee are usually prohibited by law from distributing their profits and are, therefore, quite appropriate.

The governing board of the legal entity, chosen or confirmed in an annual or semi-annual meeting of a large quorum of members or clients, should ensure adequate representation of all of these. A smaller executive committee should also be named. The success of the venture depends almost entirely upon two factors: the commitment of the board of directors and the professional competence, motivation and integrity of senior staff members.

Table 1

Delivery vs. storage methods of organization

Component	Delivery Method	Storage Method
1. FACILITIES (Vehicles/warehouse)	Temporary storage space for as long as it takes for members to collect supplies.	Warehouse large enough to accommodate quarter- or half-year supply. Objective is to build inventory. Assumes clients can get to depot.
2. SECURITY MEASURES	Established security system, e.g., hospital compound. Careful hiring and close supervision of security guards.	Full-time secretarial staff. Recruitment of security guards from known sources; use of informal social control.
3. CLEARING AND FORWARDING	Large and reputable firm handles as much as possible of task. Evaluation of all possibilities in terms of cost-effectiveness. TIMING the key.	Close working with agent, especially at first. If turnover large enough, full-time transport manager.
4. STAFFING LEVELS	– Head of project – responsible to board but relatively autonomous. – At least one "teammate" willing to travel and take more responsibility than job description specifies. – 2-3 trusty field workers. – Day labourers.	– Competent manager. – Very good assistant manager. – 2 office clerks. – Storekeeper. – 2-3 store assistants. – Labourers, drivers, cleaners.

5. OFFICE (location/size)	Small office in port of entry with – banking facilities, – lodging and accommodation, – experienced operator.	Large office located inside walls of main warehouse.
6. ORDERING/INVOICING	*All* invoicing delegated if possible to supply agency. Local customer prepares 3 copies order: one forwarded to supply agency, one kept by coop, one by customer.	Quotation sought/price list developed. Packing list triplicate book. Invoice developed and mailed as part of bookkeeping system.
7. PRESENTATION	As provided by supply agency unless unforeseen unpacking occurs.	As provided by supply agency divided by average efficiency of coop.
8. NO. OF ITEMS	Best kept low; limited to essential medicines.	Theoretically unlimited. Practical limit: 200 medicines & 200 other type supplies. Inventory control necessary.
9. TYPE OF ITEMS	High-density items, e.g., ointments, syrups best minimized. No cold chain.	High-density items to be compounded. Cold storage possible.
10. PRICING/ OVERHEAD COSTS	Quotation sought on basis of several months' advance projection. Quotation used to develop price list. Members order, pay 10% in advance by bankdraft. 25% overhead (or less).	Longer list of drugs, and quotation as price-indicator sought. Own price-indicator sent out in local currency. Members order 1 year's supply; cannot reduce but can increase. Members pay 25% in advance.
11. CASH FLOW	10% advance pays operating costs, so salaries must be covered some other way.	25% advance covers all operating and salary costs. Increased number of turnovers reduces percentage overhead.
12. INSURANCE	*In Nigeria:* SEAFREIGHT 1% INLAND TRANSIT 0.75% WAR RISK 0.25% FIRE/BURGLARY 1%	SEAFREIGHT 1% per shipment INLAND TRANSIT: by clearing agent WAR RISK Not seen as necessary FIRE/BURGLARY 1% on standing inventory p.a.

Table 2

Timing (in delivery method)

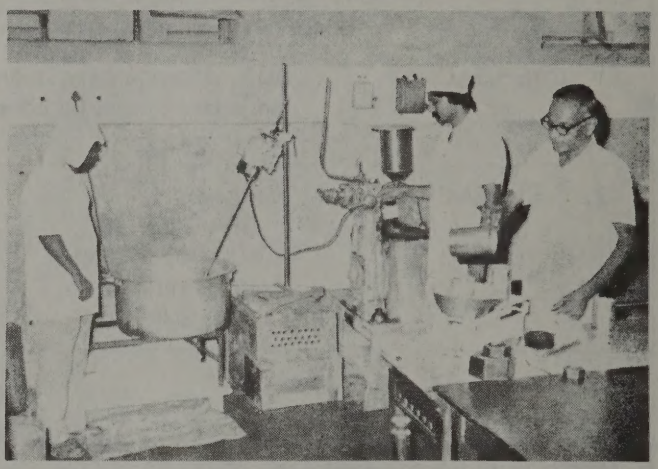
Month	Actions to be taken	Lag time
ONE	Final list of items to be ordered developed, submitted to supply agency with which supply agreement exists. Price-indicator to be valid in month 6 requested.	2 weeks' mail lag.
TWO	While awaiting quotation, members/clients visited or newsletter with ordering conditions sent out. Clearing and forwarding agents explored, key government contacts visited.	
THREE	Price-indicator received, items priced (see next section). Order form produced and distributed to members.	1 week producing time. 2 weeks' mail lag to members.
FOUR	Quick return of orders sought (by personal visits or members/clients' meeting). Banking channels or cash handling process already well established; government authorization solid at highest levels.	Completion and return of orders as long as allowed (4-6 weeks for arrival of first ones).
FIVE	Orders summarized, cut-off level decided. Cash deposited, account books opened. Copy of orders and order summary sent to supply agency.	1-2 weeks to accurately summarize orders. 2-3 weeks' mail lag.

Month	Actions to be taken	Lag time
SIX	After orders submitted, lull occurs in process while supply agency prices out order and submits final price on "pro-forma invoice". Time used to make final arrangements – clearing and forwarding agreements, duty-free status and physical facilities. A new quotation can be requested.	2-4 weeks' supply agency pricing. 2-3 weeks' mail lag
SEVEN	Pro-formas received by mid-month and payment authorized.	Supply agency needs 10 weeks from this point to ship.
EIGHT	Final arrangements made or process begun again. New quotation used to start new order process.	
NINE	Dispatch notification received from supply agency.	1 week customs clearance. 3 weeks at sea (airfreight might save 1-2 weeks).
TEN	Goods cleared and distribution begun. If new order form was developed in months six and eight, this is month four of next order.	2-3 weeks customs clearance 5-8 weeks delivery.

Rwanda

The church-related health services in Rwanda got together some years ago to establish a joint effort for in-service and continuing education for the health workers in their own programmes and in the public sector. Each year, they sponsor a continuous cycle of training periods for various levels and qualifications of health care personnel. Known as BUFMAR (Bureau des formations médicales agréées de Rwanda – the office of church-related health programmes of Rwanda) this association has also undertaken other efforts in joint planning and cooperation among its member health programmes. It has also established a cooperative pharmaceutical service which combines supply and distribution of drugs with local production.

BUFMAR purchases and distributes drugs to a total of 89 church hospitals, health centres, dispensaries, maternities, etc. It operates a revolving fund for the purchase of 50 imported and 25 locally-made products, based on the WHO essential drugs list. Adding 10% for transport and clearance and 5% for office costs to its prices, it offers goods at approximately 20% of the over-the-counter pharmacy prices. Foreign exchange is received through the national bank. BUFMAR has a foreign exchange account in Holland to which many donors reimburse money received. Its production department produces powders, ointments, syrups, drops and suppositories, and a Rwandan/Belgian project for the production of tablets and injectables is currently under consideration. BUFMAR's minimum stock is a 32-week drug stock reserve. This is based on the annual requirements of all of its participating health programmes, allowing for 20 weeks' delivery time plus 12 weeks' reserve. It sends out a stock list to member units on which they order.



Health for the Millions, Vol. V, No. 6, VHAI, India, Dec. 1979

Tablet industry, Bangarpet, India

Sierra Leone

The Christian Health Association of Sierra Leone (CHASL) is a much smaller national coordinating agency for church-related health

services than CHAN in Nigeria. The member health programmes nonetheless suffer from the same kinds of problems of maintaining an adequate and dependable supply of pharmaceutical products. About three years ago, CHASL members decided to create a pharmaceutical service based in part on the example of CHANPHARM in Nigeria. A pharmacist was recruited and spent time with the pharmaceutical procurement agencies in Europe as well as visiting CHANPHARM for a training experience. The CHASL Pharmaceutical Service is still in its early phase and is adapting the models of other countries to the much lower-scale operation in this relatively small country. It has examined the questions around compounding and local production, particularly for wet products, and is moving slowly and deliberately to do this on a decentralized basis, making use of expertise and the facilities in some of its member hospitals, which could potentially produce enough at least for the national NGO needs for eye ointments, intravenous solutions and the like.

Bangladesh

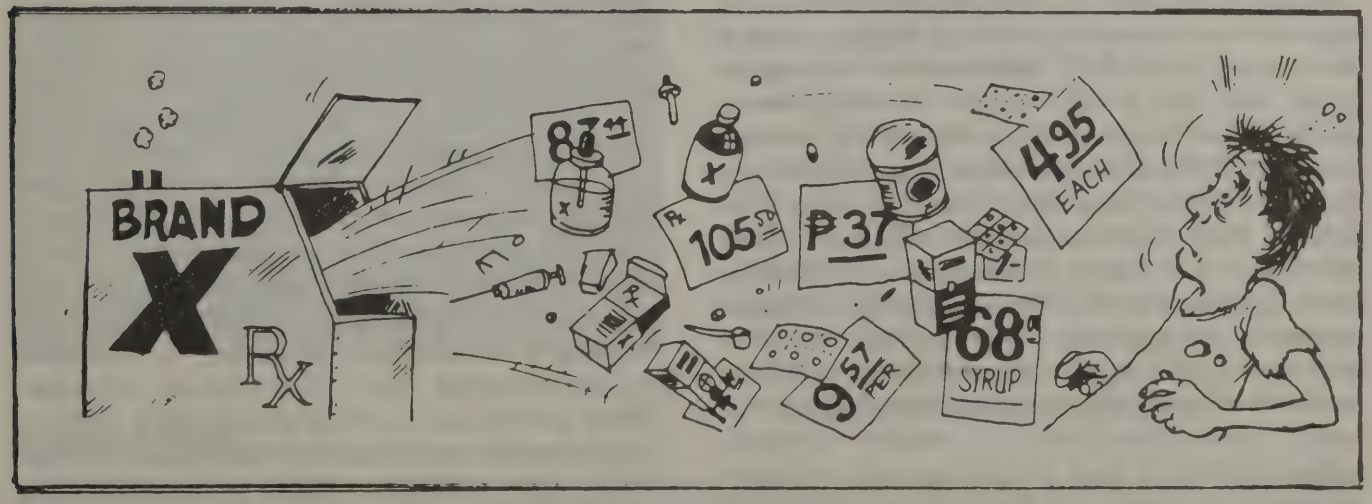
(The following section is based on a report by Zafrullah and Susanne Chowdhury.[31])

Gonoshasthaya Kendra (People's Health Centre) is a charitable trust, set up in 1972 in Bangladesh to establish a health programme with an emphasis on preventive and primary health care. Its central clinic and training facility is located in Savar, north of the capital of Dacca. Bangladesh is another country with pharmaceutical supply problems, and it experiences the pressures of many different transnational pharmaceutical corporations operating within its borders. The leaders of Gonoshasthaya Kendra, therefore began to think about establishing a pharmaceutical factory to solve some of their problems. They set out four principles on which it would be based: low prices, quality, essential drugs and responsible market practices. After a 7-year process of planning and preparation, Gonoshasthaya Pharmaceuticals Ltd. (GPL) was founded in 1981, with funding from Dutch and British voluntary agencies and commercial loans. Its board of directors comprises representatives from the Ministries of Health and Industries, the Bangladesh Shilpa (Industrial) Bank, Gonoshasthaya Kendra and a Dutch voluntary agency.

Within one year, GPL was producing some 30 basic drugs and preparations including aspirin, vitamin C, oral rehydration salts and several antibiotics. These were sold at prices 35-50% lower than market prices, calculated to leave GPL with an overall profit of 10-15%, to be invested in expansion, research and new enterprises. GPL products are marketed partly to government and partly through a chain of special retail shops (presently being created).

GPL's first 18 months were, however, plagued with a number of thorny problems, principally in the following areas:

Personnel: Determined to employ only needy applicants for the unskilled jobs available, GPL recruits had to be given basic functional education (technical and literacy training) before starting work, and a training allowance. Skilled workers of all categories were difficult to find due to the wave of migration to the Middle East. As far as professional staff



Health Concerns, Vol. II, No. 6, NEHCC/NCCP Philippines, 1981

...extreme proliferation of pharmaceutical product formulation and presentation ion

were concerned, the project was plagued with a continuing brain drain of qualified staff chosing to work in industrialized countries, in government or in consultancy jobs with international organizations and transnational corporations which offered more attractive conditions and incentives.

Social and political environment: While it is government policy to encourage industrial production of such essential items as drugs, and while the quality and marketing of drugs is controlled by government ministries and offices, in practice, the vast task of supervision and control of producers and retailers is beyond the capacity of a small number of officials. It has been publicly recognized that the bureaucratic processes in Bangladesh move at a very slow pace, and the national media are filled with charges of corruption in many aspects of the country's industrial and commercial life.

Infrastructure and equipement: The lack of infrastructure, particularly the unreliability of electricity supply, interacted with the lack of technical expertise and the need to import equipment to create serious maintenance problems.

Marketing: With its insistence on quality control and social benefits for its workers, GPL's overheads were very high, forcing them to set higher prices than desired for some items. Selling their products on the open market required an immense educational effort – of the public, doctors and pharmacists "sold" on the benefits of brand-name drugs. GPL seemed to encouter a public lack of confidence in anything made in Bangladesh. Selling through existing pharmacies was difficult for this reason. The plan to set up a network of special retail stores is still in its infancy, and it was difficult to find pharmacists willing to forgo the high profits made on brand-name drugs. An effort to educate the public, doctors and pharmacists on the value of generic drugs via a monthly magazine was hampered by GPL's staff shortages. Nevertheless, after sending out the first 5 issues to village doctors, health workers, pharmacists and medical students throughout the country, free of charge, 15,000 copies of each issue are now subscribed and sold through newsagents.

While GPL hoped that after an initial period, 60-70% of its production would be sold in bulk to government and non-governmental health services, the commercial pharmaceutical companies began to exercise a great deal of influence and pressure to retain their highly profitable market in Bangladesh and successfully underbid GPL for big government contracts. When the government invited tenders for drugs in 1981, the commercial companies responded so that, for each drug, there was at least one commercial bid offering a lower price, lower than those the companies themselves had tendered in 1980. It seemed that each commercial operation had agreed to cut its prices for one drug, accepting the loss to keep GPL from succeeding in its effort to become a major supplier to the government. At the time of this writing, the outcome of this struggle is still not clear.

Other countries

Examples from other countries could be multiplied here, but most of them are based on the essential principles which the above examples have set forth. In Indonesia, for example, a pharmaceutical operation was established in central Java in 1967 to serve, initially, the health services of several closely cooperating and geographically neighbouring churches, and presently produces some 100 different medicines at prices 20-30% lower than those same drugs produced locally, and a great deal lower than those of foreign products. The capacity of this service, Yakkum-Pharma, has grown slowly due to certain limitations: their investment in equipment – for production and quality control of raw materials and products – has of necessity been very modest, and their working capital is also very limited which means delay in ordering new supplies and raw materials. Yakkum-Pharma currently serves a growing clientele of church-related and voluntary agency programmes in Indonesia, primarily on Java. A list of needed equipment has recently been submitted for funding to a Dutch donor agency; if granted, expansion of their capital stock should allow Yakkum-Pharma to extend their services to other parts of Indonesia. Transport will, however, remain a problem in this very large country, both because of its cost and because of long delays in delivery. Yakkum-Pharma's experience provides a valuable model for other Asian countries to examine. Other countries in Africa are similarly beginning the effort to deal with pharmaceutical supply as well as other means of joint planning and coordination. The CMC has employed a special consultant to undertake field visits to

several countries where pharmaceutical supplies are a particular problem. Surveys have already taken place in Sudan, Uganda, Zaïre and Ghana, and other efforts are under way to meet this need in countries such as Liberia, Zambia and Zimbabwe.

Generic pharmaceutical manufacturing

In their efforts to use generic products, the European pharmaceutical procurement agencies with whom the CMC works purchase an increasing amount of their stocks from smaller companies which manufacture such products on a non-profit basis. One such company, Pharmamed, was founded in Malta in 1974, with support from the Dutch government. During the two years it took for the construction of a factory and purchase of production machinery, key staff were trained in a British generic pharmaceutical company which also provided Pharmamed with the formulations which now make up its product list. From 1976-79, the company struggled to overcome a number of difficulties related to its small size and non-profit-making status. Difficulties, such as the practice of large commercial drug firms of filling their excess production capacity with generic preparations and offering them at unrealistically low prices to undercut their competition (whilst recuperating these "losses" by the sales of brand-name drugs) convinced Pharmamed's management that there was little scope for a non-profit pharmaceutical manufacturing unit aimed primarily at Malta, where the local market cannot absorb the unit's full production capacity.

In 1979, Pharmamed embarked on a mutually beneficial relationship with a number of the European pharmaceutical procurement agencies supplying drugs to church-related health services in developing countries. At present, 80% of their manufacture goes to some six such agencies, and they are encouraging their partners to join in a unified purchasing programme for the ten to twelve products they offer. The reasoning behind this is that the higher the volume of production per item, the more favourable will be their own bargaining position with their raw material suppliers and, thus, the lower will be their production costs. These savings could then be passed on to the procurement agencies. This would also enable them to make available significant stocks of their products for immediate delivery.

LEGISLATION

The need for international and national legislation to regulate drug marketing practices has long been recognized. A World Health Assembly resolution in 1978 requests WHO's Director-General to explore the possibilities for developing an international code of marketing practices, with special emphasis on essential drugs for developing countries. So far, this code does not yet exist, but a number of action groups are busy drafting proposals for such a code. In the meantime, the WHO had already made considerable progress on the question of the selection of essential drugs. Working closely with a number of other UN bodies like UNICEF and UNHCR as well as a number of non-governmental organizations (including the Red Cross, the Lutheran World Federation and the CMC), the WHO expert committee on the selection of essential drugs, with the guidance of WHO's drug policy division, elaborated a suggested model list of essential drugs. This list appeared in CONTACT 63 (August 1981) together with supplementary lists applicable to disaster relief situations and to community health care.

A number of countries are beginning to deal with the implications of this initiative, and many have already begun to modify their national formulary to bring it into line with WHO's suggestions. Only a few countries, however, have come to grips with the need to control the extreme proliferation of pharmaceutical product formulation and presentation to achieve greater therapeutic effectiveness and the economies required to assure adequate supplies. We would like briefly to present the story of two such countries.

Bangladesh

With a population of 85 million, Bangladesh, in 1981, had an annual drug market of approximately US$ 83 million. Most of the drugs were sold commercially. Eight pharmaceutical transnationals control 80% of this drug market. In a country with one of the lowest per capita incomes in the world (US$ 70 p.a.), this means that, after food, clothing and shelter, medicines are a major part of the remaining expenditure. Due to poverty, however, and the high cost of drugs, at best 15% of the people ever buy any modern medicine. Inadequate information and the common habit of self-prescribing lead to a situation where, of the 2300 brand-name drugs on the market, 70% of the annual sales are of drugs which are therapeutically useless or insignificant. In addition, substances ac-

Health for the Millions, Vol. V, No. 6, VHAI, India, Dec. 1979

"Doctor, I've taken the tonic. But I starved for days to buy it."

tually identified as harmful and banned in developed countries continue to be marketed and manufactured in Bangladesh.

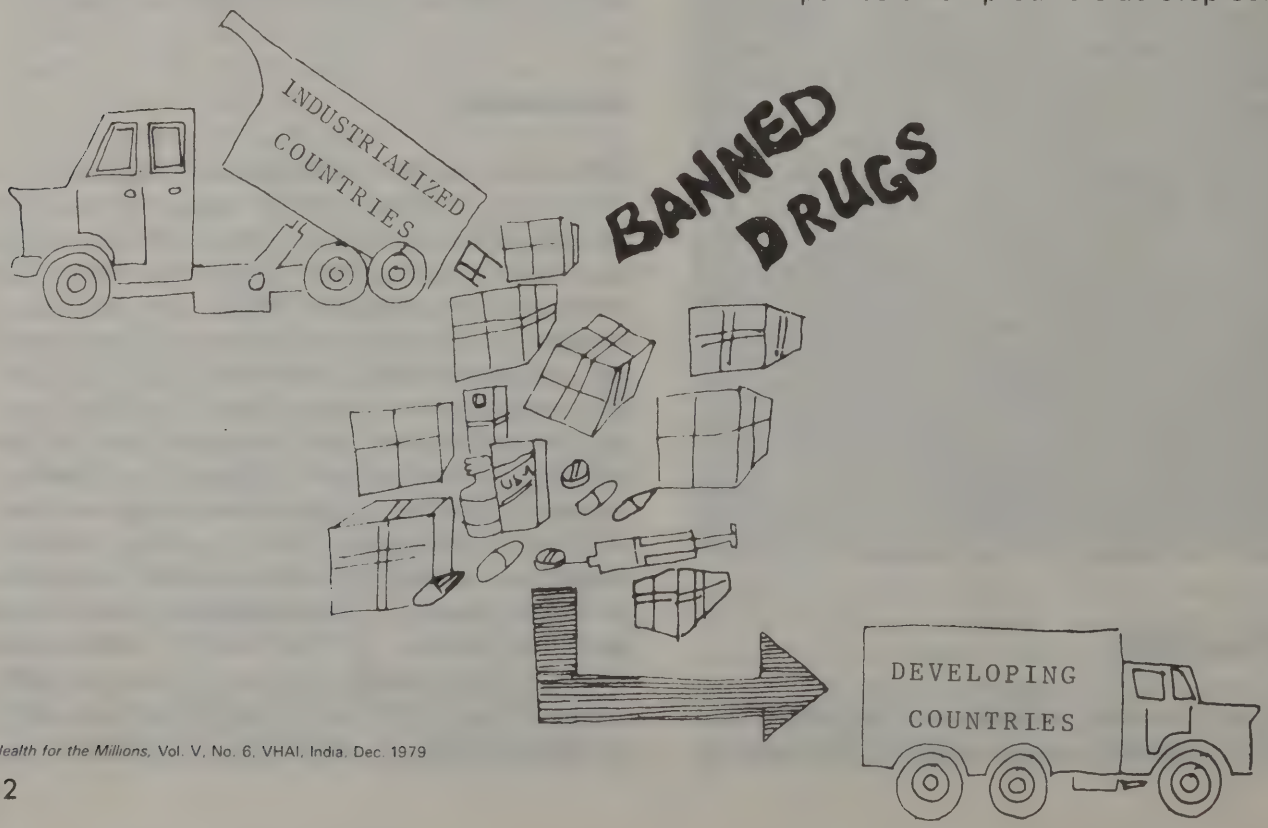
On 27 April 1982, the Bangladesh Ministry of Health set up an eight-person Expert Committee to evaluate all the registered/licensed pharmaceutical products presently available in the country and to formulate a draft National Drug Policy consistent with the national health needs. The Committee identified the following as the main weaknesses of the national health policy:

- poor laws, poorly enforced,
- exploitation of consumers,
- undesirable foreign domination, and
- waste of national economic resources.

The Committee suggested identifying a list of 150 essential and 100 supplementary drugs, annual reviews of drugs for usefulness and cost-effectiveness and elimination of all unnecessary, useless and harmful drugs from the market.

On 12 June 1982, the Ministry of Health published a New Drug Ordinance prohibiting the future sales of over 1700 drugs. "Essentially, the Bangladesh Drug Ordinance permits only the 220 essential drugs, recommended by WHO, to remain on the market. Explicitly, the law includes the banning of combination drugs where a single drug is available, effective and less costly; the marketing of vitamins in a combination pill or liquid with the exception of vitamin B complex; the sale of tonics which claim restorative powers but prey on the consumers' ignorance, and of drugs where therapeutic value is questionable; and the use of medicine, except by specialists, where side-effects are known. The three schedules were promulgated in the law to dictate the time by which these drugs must be off the market."[4] For each banned drug, the manufacturer and the reasons for the banning were listed. The Ordinance also stated that no medicine can be made in Bangladesh by a foreign-based drug firm if a national company can produce the same drug.

While the WHO added its support to this effort, the drug industry's reception of the Ordinance was less than enthusiastic. A number of companies attempted to side-step some of



Health for the Millions, Vol. V, No. 6, VHAI, India, Dec. 1979

the provisions. For example, at least three companies were granted a concession to export banned products to Europe for relabelling and shipment to other developing countries. Several firms attempted to force a loophole in the provision which allowed them up to 18 months to run down existing stocks and the raw materials for their manufacture. Yet others applied for permission to continue manufacturing a particular drug on the grounds that it met a special need.

Despite these attempts to undermine the policy, observers in Bangladesh feel it is having some impact. In any case, it is not only a Bangladesh fight. It has far-reaching implications for, and support from, other Third-World countries. India and Sri Lanka have had similar fights in their attempts to centralize drug purchasing for their countries. If the Bangladesh laws stand, many countries will have a model by which to rationalize their drug expenditures.

Mozambique

An example of a country which has successfully implemented a restricted drugs list, based on the WHO model, coupled with competitive bulk buying and an education programme to transform prescribing habits, is offered by Mozambique. The evidence there points to a positive improvement in health care which meets people's needs.

After Independence in 1975, health care was nationalized and private practice banned in Mozambique. The Ministry of Health established a Pharmaceutical Commission which, in 1977, published a restricted drugs list of 430 items. This was cut down in 1980 to 340 essential drugs, identified by their generic names. Expensive formulations were excluded in favour of cheaper ones, e.g., tablets or capsules in place of syrups and suppositories, adult preparations (which can be administered in reduced dosages) instead of children's preparations. Useless and harmful drugs were likewise excluded. A number of patent medicines initially excluded later reappeared on the list, however, in a concession to the demand of middle-class urban people, still influenced by propaganda from colonial times. While this compromise "shows the tensions between urban curative care and rural health"[5], a study conducted by the Pharmaceutical Commission on prescribing in the Maputo area found that only 14 percent of all medicines prescribed were inessential – a very low proportion by world standards.

Only drugs on this essential drugs list can be prescribed, and the law requires prescription for most drugs. Only doctors can prescribe all of the 340 items on the list. Depending on their level of education and training, other categories of health workers have the right to use half, one-third, or even less of the total number of drugs on the list. There are regulation treatment schedules for a number of the most common illnesses such as TB, malaria, schistosomiasis and intestinal parasites, which start with the cheapest treatment. An additional guide to the cheapest and most effective use of drugs is the official "Therapeutic Guide" in which the side effects, dangers, and illnesses for which they are most appropriate are indicated for all the drugs on the list.

The second strategy in the government pharmaceutical programme was an educational one, particularly for doctors, nurses and health workers. Because diarrhoea was one of the biggest child killers and one of the biggest wasters of drugs, diarrhoea treatment by rehydration instead of antibiotics (particularly chloramphenicol, which is still being imported for the treatment of typhoid) has been a special focus of training to reform and form good prescribing habits. The results have been dramatic. Fewer children die of diarrhoea or of the side effects of chloramphenicol. And Mozambique is spending less on unnecessary antibiotics.

A third strategy in the government's thrust to make essential drugs available to all at lowest cost was bulk buying. In 1977, a state purchasing company, Medimoc, was set up to import all drugs to meet national needs and, in 1979, private importing ended. Each year, Medimoc publishes a list of its annual pharmaceutical needs and invites bids. The range in prices quoted has been enormous, e.g., from US$ 132 to $ 8 per thousand for chloroquine. Prices paid on some drugs are sometimes up to 10 times lower than what was paid before Independence.

"The new lower prices are passed directly on to the consumer. About two-thirds of drugs are distributed directly through the health service where prescription fees range from nothing up to Medimoc's bulk import price,

depending on the drug and patient's income. The other third are distributed through shops. Prices there are fixed at double the import price, to allow both a tax and a profit margin for the shop. The main cities have chemist shops which fill prescriptions. In rural areas, more than three hundred shops are now licensed to sell a range of non-prescription medicines such as chloroquine, aspirin and drugs for ear and skin infections and intestinal worms."[5]

Drug imports to Mozambique today cost the same as they did 10 years ago, i.e., c. U$ 1 per person. "Mozambique is buying a lot more drugs for its money, simply by not wasting money on useless and dangerous drugs, on fancy packets and on well-known trade names."[5] And this means that, for the first time, basic medicines are now available in even the most remote parts of the country.

■

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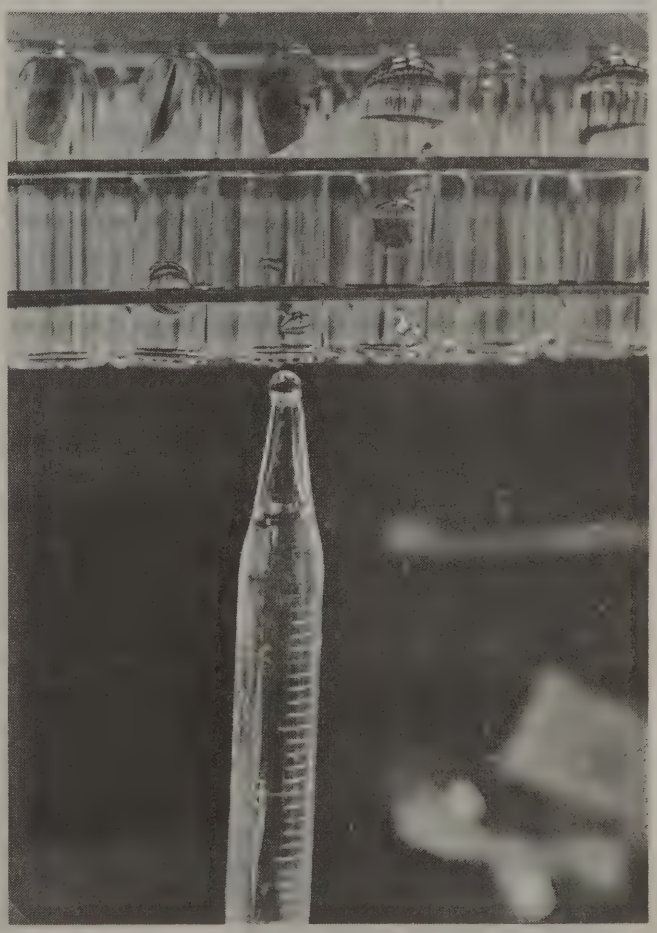
SHELF LIFE OF DRUG SUPPLIES

Many health workers in developing countries have to deal with a limited budget and often erratic supplies of the drugs they need. Often, they must stretch limited supplies as far as possible and, thus, are confronted with the dilemma of whether "expired" drugs are still safe and effective. Many also will have had the experience of dealing with an irate citizen who accuses the health worker of poisoning his/her child with "expired" drugs. Thus, the need to make the best use of important medicines and to avoid wastage, and the related question of how to evaluate drugs and safety margins are pressing issues.

It is, therefore, necessary to try to gather as much clear information as possible on what it means that a drug is limited by an expiry date. To begin with, it can be said that drugs do not suddenly disintegrate at that date but, rather, slowly deteriorate in various ways over time. The rate of deterioration is different for different products, for different environmental conditions and also for different preparations of the same drug. The rate of deterioration under average environmental conditions determines the conventional expiry date. This date is fixed in such a way that, under average conditions of light, temperature and humidity, the therapeutic effect is unchanged because at least 90% of the chemically active ingredient is present, and there has been no significant increase in toxicity. Some countries, such as the USA, do not accept projected shelf life of more than five years.

Up to now, the information on tests carried out to determine expiry dates is kept confidential by the manufacturers and trademark registrars. The information slips accompanying drugs do not state at what temperature and humidity the shelf life was tested, nor what the rate of deterioration will be in a hot-humid climate. In terms of shelf life measured as therapeutic effectiveness, a hot-humid climate is likely to lead to expiry prior to the date shown. But how much earlier? And with what dangers?

> "Apart from decomposition of the active ingredient, many properties of solid drugs (tablets, coated tablets, capsules) change under the influence of humidity: hardness, colour, friability, time of disintegration and bio-availability. Heat and humidity make ideal circumstances for microbiological growths in or on the preparation."[1]



WHO photo by Spooner

In 1977, a WHO Expert Committee called for simplified test procedures that would confirm the identity of a drug and, if possible, ascertain the absence of gross degradation.

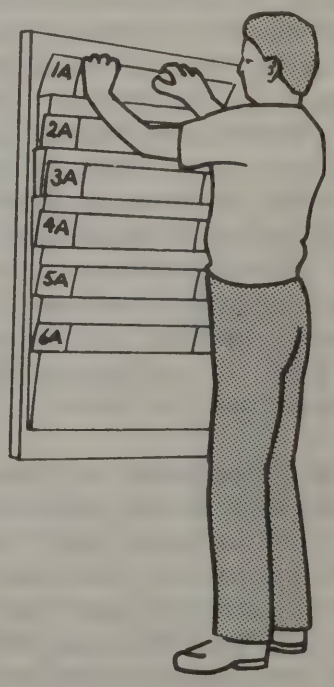
Dangers

1. *Decline in therapeutic activity*
For most essential drugs, one of the major dangers is a decline in therapeutic activity. This could be compensated for by increasing the intake. But, often, one has no idea of the percent decline in effective dosage, and this approach is, therefore, only practical for non-toxic drugs where there is no danger of overdosage. These are principally the vitamins B and C. The decline in therapeutic activity for antibiotics is most worrisome. Use of antibiotics in which therapeutic activity has declined is extremely dangerous since it favours the emergence of resistant strains.

2. *Increased toxicity*
A number of chemicals and pharmaceutical substances undergo certain changes which result in the slow build-up of toxic substances over time. This is an important factor in determining a date of expiration. Among the antibiotics, tetracycline has this liability and, with deterioration, it becomes very toxic. This is usually signalled by a change in colour from the yellow of the powder into a brown, rubbery substance. Any changes in this direction indicate that the drug is no longer to be used.

3. *Allergenic power*
Penicillins and cephalosporines decompose under the influence of heat, moisture and acidity. While they lose therapeutic activity, they acquire increasing power to provoke allergy. This is particularly so with wet preparations.

What can be done to avoid these dangers?
- Within a given family or line of pharmaceutical products, some preparations are more durable than others. For example, freeze-dried preparations are more stable than other forms of powder in injectable antibiotic preparations. Some tablets, notably coated tablets, resist the absorption of moisture better than others. Humidity always has a strong influence, and gelatin capsules are the most liable for absorption of humidity in the atmosphere; the moisture begins to destroy the integrity of the capsule and quickly gets to the contents to accelerate deterioration of the pharmaceutical substance.
- Packaging for transport and storage is very important. One should be alert to the fact that many forms of strip packaging of capsules and tablets do not adequately exclude moisture. Aluminium or synthetic foil wraps may be, in general, more dependable. Natural rubber or neoprene bottle-stoppers are also less dependable than stoppers made of butyl rubber. Drugs which come in very large quantities, packed loose in large bottles or packages, often mean that the seal remains broken for a long time while the contents are slowly used up, and this also accelerates deterioration.
- Storage conditions: Obviously, drugs need to be kept out of the sun, in a dry place, in containers that protect them from humidity. Some drugs require lower storage temperatures than others, and the inclusion of an air-conditioned room in drug storage facilities for several of these drugs may provide long-term savings in assuring full shelf life.
- Inventory control: Carefully managed inventory and stocking methods will also assure ordering in quantities appropriate to the annual use in a given health facility, as well as ensuring that the "oldest" drugs will be used first.
- Quality control: Quality control is not something which can simply be left to a sophisticated quality control laboratory. The availability of quality control services by contract in certain countries will need to be used to help spot-check pharmaceutical supplies. However, every drug storeroom manager will have to exercise a form of informal quality control, as well as inventory management.



How to look after a health centre store, AHRTAG, UK

Careful inventory control

"Before using an out-of-date drug, one must consider the urgency of the situation, the length of time by which the drug is outdated, how it has been stored, and whether fresh supplies are available. When the age of a drug is uncertain, short of pharmaceutical testing, one can only go on appearance and smell."(1)

Certain information has now been gathered by a UK-based organization dealing with appropriate technology for health, the Appropriate Health Resources and Technologies Action Group (AHRTAG). In a recent publication, reviewed in the back of this issue of CONTACT, as much information as is now available about shelf life and the kind of quality control that can be exercised by all those responsible for pharmaceutical supplies, has been put into a clear and graphic form. In the accompanying box, some of the most helpful information given is presented. For further information or a copy of this publication, please write directly to TALC (see page 23).

Recognizing drugs and supplies that are spoilt

No matter how careful you are, you may find that some of your supplies are spoilt. It is often impossible to tell if supplies are spoilt, but here are a few tips to help you.

Smell: When some items such as aspirin have been attacked by too much heat and damp, they smell. If a tin smells when you first open it, the aspirin are useless. One needs, of course, to know the normal faint odour of a aspirin container.

Colour: Some drugs lose their colour when they are spoilt. Make sure you know what colour a tablet should be. If it is a different colour or colours, do not use it.

Breaking up: When tablets are damp they break up. You must not use them.

Drying out: Condoms are normally lubricated. If they have dried out, you should not use them.

Melting: Oral rehydration salts (ORS) may melt above 30° C. If you find ORS packets which are dark brown and sticky and will not dissolve, do not use them. Capsules may also melt with heat and as moisture attacks the gelatin. This also signals likelihood of moisture getting to the contents. If you find capsules are stuck together, do not use them. If suppositories, pessaries, creams and ointments have melted and become runny, do not use them.

Table 1

Properties and storage of some dangerous chemicals and drugs

Key

A^1 Flammable: store in a metal box at ground level, preferably in an outside store.

A^2 Highly flammable: store in a metal box at ground level, in a well-ventilated fire-proof outside store.

B Corrosive: store at low level. When you open the container, place a heavy cloth over the neck and stopper.

C Toxic (poisonous): store in a safe place, preferably in a locked cupboard.

D Injurious or irritating vapour: store in a bottle with a tight stopper in a safe place.

E Harmful: store in a safe place, not on an open shelf.

F Oxidizing: store away from organic material, reducing agents, and flammable chemicals.

G Explosive

H Deliquescent (dissolves in water from the air): store in a bottle with a tight stopper.

I Volatile (vapourizes rapidly): store in a bottle with a tight stopper.

Chemical	Properties and storage
Acetic acid, glacial	A^1, B, D
Acetone	A^2, D, I. Do not allow this to come into contact with chromic acid as this can cause a violent chemical reaction.
Ammonia solution	B, D, I
Barium chloride	C
Chloroform	C. This forms toxic carbonyl chloride on exposure to light. Always store in a dark bottle. Chloroform vapour is anaesthetic.
2, 4-Dinitrophenyl-hydrazine	C

Diphenylamine	C, D
Ethanol, absolute	A^2, E, I. Hygroscopic
Ethanolamine	B, D
Ether, diethyl	A^2, I. They may form explosive peroxides when exposed to light. Always store in a dark bottle. Use in a well-ventilated laboratory. Ether vapour is anaesthetic.
Formaldehyde solution	C, D
Hydrochloric acid, concentrated	B, D. Violent chemical reaction can occur if it comes in contact with chromic acid.
Hydrogen peroxide solution	B, F. Store in a dark polythene bottle in a cool place. Decomposes in light and warmth.
Iodine	E, I. Store in a dark bottle.
Mercury	C, D, I. It attacks lead piping and soldered joints.
Mercury II chloride	B, C
Mercury II nitrate	C
Methanol, absolute	A^2, C, D, I. Hygroscopic.
Nitric acid, concentrated	B, D, F. Store in a dark bottle with a tight stopper. It is a fire risk when it comes into contact with combustible materials.
Phenol (carbolic acid)	B, C. Hygroscopic. Oxidizes and turns pink on exposure to light. Store in a dark bottle.
o-Phosphoric acid	B, E
Picric acid (solid)	A^1, C, D. Explosive when dry; therefore, make sure the chemical is always covered with water.
Potassium cyanide	C. Highly toxic when you breathe it, swallow it, or it comes in contact with skin. Wear mask and protective gloves when you handle it. Always store in a locked cupboard. It develops highly toxic gas upon contact with acid.
Potassium dichromate	E. It irritates eyes, respiratory organs and skin.
Potassium hydroxide	B, H
Potassium oxalate	C
Silver nitrate	B, F. Store always in a dark bottle.
Sodium azide	C. Highly toxic when you swallow it. Develops highly toxic gas upon contact with acid.
Sodium hydroxide	B, H
Sodium nitro-prusside	C
Sulphanilic acid	E
Sulphuric acid	B, H. Hygroscopic, *never* add water to the acid when diluting. Always add the acid to the water.
Thiozemicarbazide	C
Toluene	A^2, D
o-Toluidine solution	A^1, C
Trichloroacetic acid	B, D, H
Xylene	A^2, D, I

Table 2

Storage recommendations and stability characteristics of 33 selected drugs from the WHO model list of essential drugs

Essential drugs	Storage temperature	Maximum storage time	Protect from	Indicators		Comments
				Good	Perished	
Acetylsalicylic acid tablets (aspirin)	up to 30°C	expiry date	light moisture heat<40°	white tablet	Acetic Acid odour	very stable
Aluminium hydroxide tablets	⩽25°	"	air moisture heat			
Ampicillin powder for oral suspension	⩽25°	"	air light moisture heat			once reconstituted refrigerate
Benzoic acid and Salicylic ointment	<30°	"	heat			stable
Benzyl benzoate lotion		"	air light heat			
Benzylpenicillin	⩽30°	"	heat			very stable
Chloroquine hydrochloride tablets	<37°	"	air light			very stable at up to 37° and 80% humidity
Chlorpromazine gluconate injection		"	light		brown or violet colour	
Chlorhexidine		"	heat light			
Dapsone tablets		"	light moisture		discoloration by light *without* decomposition	
Diazepan injection		"	light			
Epinephrine (adrenaline) injection	up to 25°C	"	air light		red colour	darkens on exposure to air and light with loss of potency
Ephedrine sulfate or hydrochloride tablets		"	light moisture			
Ergometrine injection	up to 15° (refrigerator)	"	heat light			
Ferrous sulfate and folic acid tablets		"	air		discoloration change in consistency	
Isoniazid	up to 25°	"	heat light			stable for 1 year at<25°
Iodine solution	up to 35°	"				very stable
Lidocaine hydrochloride injection		"				very stable
Metronidazole tablets		"	moisture light			stable
Niridazole		"				

Essential drugs	Storage temperature	Maximum storage time	Protect from	Indicators		Comments
				Good	Perished	
ORS packets	below 25°C if possible	expiry date	air moisture		dark brown, will not dissolve	
Paracetamol (Acetoiminophen) elixir	above 8°C	"	air light			elixir should *not* be refrigerated
Phenobarbital tablets		"	air moisture			very stable
Piperazine elixir		"	air moisture light			stable
Phenoxymethyl penicillin tablets	up to 30°C	"	moisture			
Procaine	up to 30°C	"	heat			very stable
Retinol (Vitamin E) capsules	up to 15°C (refrigerator)	"	air moisture light			
Senna tablets		"	moisture light			
Sulfacetamide (ophthalmic) ointment	15 to 18°C	to 2 years if unopened 10 days if open	air moisture light			
Sulfamethoxazole trimethoprim tablets		"	air light moisture			
Tetracycline tablets		1 year	air light		brown and when broken	expired tablets may be toxic
Thiabendazole tablets			moisture			
Water for injection					Cloudiness	

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29th International Seminar on Leprosy and Workshop on Training

Seminar 12-18 September 1983

Purpose: To provide an up-to-date review of clinical leprology and leprosy control. Specific seminar objectives will be developed as soon as participants register, focusing on their particular requirements.

Workshop 20-24 September 1983

Purpose: To introduce participants to a modern, systematic approach to training to enable them to make their own training programmes more effective and enjoyable. Extensive use will be made of the National Hansen's Disease Center facilities.

Price:
Only cost is transportation to New Orleans and return. Room and meals are provided free and there is no registration fee.

Venue:
National Hansen's Disease Center
Carville, Louisiana, USA.

Transport:
Participants will be met at New Orleans International Airport on September 12 at 15:00. Since no other transportation to Carville exists, flight plans should be made accordingly.

Registration:
Applications should be sent, before August 1, 1983, to:

Dr W.F. Ross
American Leprosy Missions
1262 Broad Street
Bloomfield, NJ 07003
USA

* * *

Liverpool School of Tropical Medicine Certificate in Tropical Community Medicine and Health

January-March 1984
September-December 1984

These international 13-week courses are designed for nurses and other members of the primary health care team who will be working in Third-Word countries. The emphasis is on the health problems encountered in these countries and on the wider range of skills needed to tackle these problems.

Course fee: £600.—

Applications for the January-March 1984 course close on 30 June 1983; for the September December 1984 course, on 30 March 1984.

For further details and application forms, write to:

CTCM&H Course Secretary
Liverpool School of Tropical Medicine
Pembroke Place
Liverpool, L3 5QA / UK

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TALC – Teaching Aids at Low Cost is a UK-based non-profit organization offering low-cost health teaching aids to health workers all over the world. These aids fall into three main categories:

- *Books* on nutrition, child health, health planning, primary health care, development, appropriate to underdeveloped country health needs and problems.

- *Slide sets* of 28 or 48 slides with detailed scripts (also available on cassettes). Topics covered include:

- Breastfeeding
- Fibre in human diet
- Malnutrition
- Nutrition rehabilitation
- Leprosy
- Diarrhoea management
- Mental handicap
- Contraceptive devices
- Charting growth in small children
- Endemic goitre and cretinism
- Protein-calorie deficiency
- Guinea worm
- Development in the first year
- Common skin diseases
- Communication in health
- Management of kwashiorkor
- Severe measles
- Developmental screening
- Twin pregnancy and labour
- Primary child care
- Physiology of women

• *Accessories* including "Road-to-Health" weight charts; flannelgraphs of the growth chart and on nutrition and child health; weighing scales; Weight-for-Height charts; anaemia recognition charts; sets of measuring spoons for making oral rehydration solution, for clinic use and a separate set for home use.

Requests for complete lists of all TALC teaching materials and for order forms should be addressed to:

Miss C.L. Bate
Publicity Officer
TALC
62 Brocket Road
Welwyn Garden City
Herts. AL8 7TU / UK

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NEW PUBLICATIONS

A useful technical paper describing recent developments in Zimbabwe in the design of **ventilated improved pit (VIP) latrines** has recently been published by the World Bank Technology Advisory Group. The paper provides two basic designs, one suitable for peri-urban areas and the other, a low-cost version of the first, for rural areas. The paper carries a general description of each design, information on odour and insect control & specific construction information. It contains an ample quantity of full-page, clear figures, working drawings and photographs, as well as materials' schedules.

This paper ("Ventiliated Improved Pit Latrines", *Technology Advisory Group Working Paper* WP/02, December 1982, 40 pages) is available at a token charge from:

The World Bank
1818 H Street, NW
Washinton, DC 20433
USA

or The World Bank
66, av. d'Iéna
F-75116 Paris
France

* * *

Low-cost physiotherapy aids, by Don Caston and Joan Thompson
1982 45 pages of drawings

This book, published by AHRTAG (Appropriate Health Resources and Technologies Action Group Ltd.), shows how to make simple aids for exercising different parts of the body, particularly hands and feet. The aids can be used in hospital or at home. All the aids can be made using wood or bamboo, nails, strong cloth, sand, clay or stones (for weights) and pieces of old rubber inner tube (for exercises requiring material that will stretch). Handicapped people can make these aids, and instructions on how to make hand and foot vices to hold wood in place are included.

(An earlier book from AHRTAG on low-cost aids for disabled children was reviewed in CONTACT No 68, June 1982.)

With the aim of promoting local printing and distribution of this book, AHRTAG is also making available Gestetner stencils of individual pages in the book. Each stencil can print up to 3000 copies at minimal expense.

Book price: £4.20

Inquiries and requests for the book and/or individual stencils should be addressed to:

TALC
P.O. Box 49
St Albans, Herts. AL1 4AX / UK

* * *

How to look after a health centre store
by Anthony Battersby 1983 72 pages

Proper management of health centre stores is a vital component in the effective organization and operation of supply chains for primary health care programmes. Produced by AHRTAG in association with UNICEF, this practical reference book provides basic guidelines for simplified, but sound, approaches to the running of a health centre's medical store. Separate sections deal with
- where to locate the store
- how to organize the store
- what equipment is necessary
- how to obtain supplies
- how to look after supplies
- how to organize supplies
- how to issue supplies.

Annex 1 to the book "Properties and storage of some dangerous chemicals and drugs" has been reproduced in this issue of CONTACT. Other annexes cover: how to use a cold chain monitor, how to recognize DPT, DT and TT vaccines, detailed working drawing for a tablet counter and a further reading list.

Price: £3.00 plus postage and packing

Inquiries and requests should be addressed to TALC at the above address.

* * *

Community Health Worker's Manual, by Elisabeth Wood
1982 328 pages over 500 illustrations

Designed for use in community health worker training courses in Sudan, and as a reference manual after completing the course, this manual – one in the AMREF* Rural Health Series – is of particular relevance to conditions in East Africa.

Chapters on general topics such as health and custom, community development and environmental sanitation, are followed by more specialized sections on maternal and child health, nutrition, diagnosis, treatment and prevention of common diseases, complaints and injuries, and on record-keeping.

Price: £4.20

Inquiries and requests for this and other AMREF Rural Health Manuals should be addressed to:

* African Medical and Research Foundation (AMREF)
PO Box 30125
Nairobi / Kenya

or AMREF (UK)
11-12 Dover Street
London W1X 3PH / UK

or TALC
PO Box 49
St Albans, Herts. AL1 4AX / UK

* * *

Some excellent articles on the evolution both in the thinking about Primary Health Care and its practice have recently appeared in special issues of two regular publications: *PEOPLE Magazine,* and the *Community Development Journal.*

PEOPLE Vol. 10, Nos. 2 & 3, 1983, are almost entirely devoted to the progress world-wide in Primary Health Care since Alma-Ata (1978).

Price:
Regular subscription is $ 15.– per year. (The magazine welcomes requests from people who cannot get the necessary foreign exchange.)

Requests and inquiries should be addressed to:

Mr Steve Fermer
Marketing Director
PEOPLE Magazine
IPPF
18-20 Lower Regent Street
London SW1Y 4PW / UK

The **Community Development Journal** Vol. 18, No. 2 is a special issue on community development and Primary Health Care which carries accounts of experiences in a variety of countries including the UK, Papua New Guinea, the Philippines, Malaysia and North America (in relation to Amerindians).

Price:
Subscription is £14.— per year (4 issues).
Single issues cost £6.—.

Inquiries and orders should be addressed to:

Journals Subscriptions Dept
Oxford University Press
Walton Street
Oxford OX2 6DP / UK

* * *

MEDEX Primary Health Care Series

This series of prototype health training materials is based on the experiences of the Health Manpower Development staff of the University of Hawaii and its collaborative efforts with governments in Micronesia, Thailand, Guyana, Pakistan and Lesotho, and from primary health care experiences in seventeen other countries. The materials are the end product of eight years of field trials and subsequent revisions and refinements.

"The series focuses on the training of mid-level health workers and community health workers, and on strengthening the management systems needed to support the effective delivery of primary health care services at the local level."

The full series comprises the following materials:

SYSTEMS DEVELOPMENT MATERIALS

2	STUDENT TEXT & INSTRUCTOR'S MANUAL Management Analysis Training Module
3	Drugs and Medical Supply System Workbook General Supply System Workbook Facility and Equipment Maintenance Workbook Transportation System Workbook
4	Communication System Workbook Personnel System Workbook Finance System Workbook Health Information System Workbook
5	National Planning and Management Workshop Manual District Planning and Management Workshop Manual

MID-LEVEL HEALTH WORKER TRAINING MATERIALS

Manuals for the Development of the Competency-Based Training Programme

6	Curriculum Adaptation Manual Instructor Preparation Manual
7	Training Evaluation Manual
8	Community Phase Manuel Continuing Education Manual

Prototype Modules For Training Mid-Level Health Workers

STUDENT TEXTS & INSTRUCTOR'S MANUALS:

8 & 10	Identifying the Preventive Health Needs of the Community Meeting the Preventive Health Needs of the Community
11	Working with Community Health Workers
12 & 13	Anatomy & Physiology Medical History Physical Examination
14 & 15	Respiratory & Heart Gastrointestinal Genitourinary
16 & 17	Skin Dental, Eyes, Ears, Nose & Throat

18, 19 & 20 Infectious Diseases
Other Medical Problems
Trauma & Emergency

21 & 22 Prenatal Care
Labor & Delivery
Postnatal Care

23 & 24 Diseases of Infants and Children
Problems of Women
Child Spacing

25 & 26 Working with the Health Team
Working with Support Systems

27 Supervising MLHWs

Prototype Reference Manuals for Mid-Level Health Workers

28 Formulary

29 Diagnostic and Patient Care Guides

30 Patient Care Procedures

31 Health Centre Operations

COMMUNITY HEALTH WORKER TRAINING MATERIALS

Prototype Modules for Training Community Health Workers

32 Working in the Community
Healthful Living Practices

33 Caring for Pregnant Women
Assisting a Normal Birth

34 Child Spacing
Child Care and Nutrition

35 Prevention and Care of Diarrhoea and Dehydration
Prevention and Care of Illnesses and Emergencies

Price:
US$ 300.— for the whole set. (Requests from developing countries for all or some of these materials at special reduced prices will be considered.)

Inquiries and requests should be addressed to:

Health Manpower Development Staff
University of Hawaii at Manoa
1833 Kalakaua Ave., No. 700
Honolulu, HI 96815
USA

CONTACT is the periodical bulletin of the Christian Medical Commission, a sub-unit of the World Council of Churches. It is published six times a year and appears in four language versions: English, French, Spanish and Portuguese. Present circulation is in excess of 23,000. The papers presented in CONTACT deal with varied aspects of the Christian communities' involvement in health, and seek to report topical, innovative and courageous approaches to the promotion of health and integrated development.

The editorial committee for CONTACT consists of: Stuart Kingma, Director and Editor, Miriam Reidy, Editorial Assistant and Heidi Schweizer, Administrative Assistant. The rest of CMC staff also participate actively in choosing topics for emphasis and the development of materials: Eric Ram and Cécile De Sweemer, Associate Directors, Jeanne Nemec, Secretary for Studies, Melita Wall, Consultant. Fernande Chandrasekharan, Secretary, is responsible for the CONTACT mailing list, assisted by Valerie Medri and Minnie Carles-Tolra, Secretaries. CONTACT is printed by Imprimerie Arduino, 1224 Chêne-Bougeries/Geneva, Switzerland.

CONTACT is available free of any subscription payment, which is made possible by the contributions of interested donors. In addition, regular readers who are able to make a small donation in support of printing and mailing costs are encouraged to do so.

Certain back issues are available on request. A complete list of these is published regularly and appears in the first issue of each year in each language version. Sets of selected back issues or bulk orders of a particular issue going to industrialized countries will be charged at SFr. 1.— per copy plus postage.

INDEX OF PAST "CONTACT" ISSUES AVAILABLE ON REQUEST

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25	February 1975	Primary Health Care and the Village Health Worker – CMC
29	October 1975	Towards a Broader Understanding of Support and Healing: The Church's Healing Ministry in Africa – K. Appiah-Kubi; The Experience of Healing in the Church in Africa – H.-J. Becken
36	December 1976	Health and Development in Zaïre – Konde Pambu Yemba/D. Fountain
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41	October 1977	Rural Basic Health Services: The Lardin Gabas Way – edited by E. Ram, J. Stromberg and D. Hilton
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73	June 1983	Strengthening & Regulating the Supply, Distribution & Production of Basic Pharmaceutical Products – CMC

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Special Series No 1: Issues nos. 2, 8, 11, 18, 20, 25, 26, 28, 32, 33, 39, 40, 43 and 48.

Special Series No 2: Issues nos. 1, 4, 9, 14, 16, 27, 29, 42, 46 and 47.

A full listing of the titles of the above issues can be obtained from the CMC.